Newsletter, autumn 1995: 31 pp.

Jassby, A. D., W. J. Kimmerer, S. G. Monismith, C. Armor, J. E. Cloern, T. M. Powell, J. R. Schubel, and T. J. Vendlinski, 1995. Isohaline position as a habitat indicator for estuarine populations. Ecological Applications 5: 272-289.

Kimmerer, W. J., 1997. Flow effects and density dependence in striped bass. Interagency Ecological Studies Program for the Sacramento-San Joaquin Estuary Newsletter, autumn 1997: 31 pp.

Lasker, R., 1984. The role of a stable ocean in larval fish survival and subsequent recruitment, in R. Lasker (Ed.), Marine fish larvae: morphology, ecology, and relation to fisheries. University of Washington Press, Seattle, WA. 131 pp.

Lechowicz, M. J., 1982. The sampling characteristics of electivity indices. Oecologia 52: 22-30.

Limburg, K. E., M. L. Pace, D. Fischer, and K. K. Arend, 1997. Consumption, selectivity, and use of zooplankton by larval striped bass and white perch in a seasonally pulsed estuary. Transactions of the American Fisheries Society 126: 607-621.

Merz, J. E. and C. D. Vanicek, 1996. Comparative feeding habits of juvenile chinook salmon, steelhead, and Sacramento squawfish in the lower American River, California. California Fish and Game 82: 149-159.

Obrebski, S., J. J. Orsi, and W. Kimmerer, 1992. Long-term trends in zooplankton distribution and abundance in the Sacramento-San Joaquin Estuary. Interagency Ecological Studies Program for the Sacramento-San Joaquin Estuary Technical Report 32: 42 pp.

Orsi, J. J., 1995. Radical changes in the estuary's zooplankton caused by introductions from ballast water. Interagency Ecological Studies Program for the Sacramento-San Joaquin Estuary Newsletter, summer 1995: 19 pp.

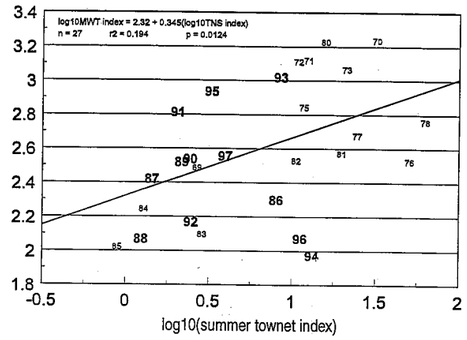

Figure 7
Relationship between the summer tow net index and fall midwater trawl index for delta smelt 1969-1997. Data points since the introductions of *Potamocorbula* and *Pseudodiaptomus* (1986-1997) are in bold type.

Going Surfing

Randall Brown, DWR

Effective February 1, 1998, Pat Coulston, IEP's Program Manager, will assume a new position with the Department of Fish and Game's Region III. Pat will be assigned to the region's Monterey office and probably will be found on a surf board during many of those evenings and weekends when the surf is up.

Pat has been Program Manager since 1994; prior to that he worked in the IEP's San Francisco Bay and fish facilities elements. Before coming to DFG in the mid-1980s, he worked in the Bay/Delta with a private consulting firm.

Pat's performance in all his IEP assignments has been characterized by vision, technical competence, dedication, enthusiasm, and an unfailing (well, almost unfailing) infectious cheerfulness. The IEP has evolved considerably over the past few years and much of this positive evolution is due to Pat's personal contribution. We will miss him but wish him and his family all the best in their move to the coast and in their new jobs. We hope he will be able to attend some of the annual Asilomar meetings to keep in touch with Bay/Delta people and programs.

San Joaquin Salmon

Tim Ford, Turlock Irrigation District

In response to my request, the IEP's Central Valley Salmon Team recognized the San Joaquin Basin Resource Monitoring and Coordination Group as a satellite team. (Satellite teams are included under the auspices of the Central Valley Salmon Team to increase coordination and information exchange among salmonid monitoring and research activities. Satellite teams may receive IEP funding but are not controlled by the IEP.) This group has met quarterly since December 1996 with the purpose of facilitating monitoring coordination and information exchange in the Stanislaus, Toulumne, and Merced rivers and the mainstem San Joaquin River between the mouth of the Merced and Mossdale.

I have been the coordinator of this group which has included representatives of DFG, DWR, SWRCB, USFWS, USBR, water districts, environmental groups and private consultants. Meetings have addressed salmon related activities as well as habitat monitoring, modeling and research. The group is co-sponsoring a February 4, 1998, monitoring/research/restoration workshop for the San Joaquin system.

Preliminary Results on the Age and Growth of Delta Smelt (*Hypomesus transpacificus*) from Different Areas of the Estuary Using Otoltith Microstructure Analysis

Lenny Grimaldo and Bonnie Ross, DWR and Dale Sweetnam, DFG

Introduction

For many estuarine fishes, recruitment is related to larval growth rates (Houde 1987). Even small changes in growth rates can translate into tenfold changes in annual abundance (Houde 1987; Rutherford, Houde, Nyman 1997). For delta smelt (*Hypomesus transpacificus*), Moyle *et al* (1992) hypothesized that the growth of delta smelt rearing in the more productive, shallow waters of Suisun Bay would be greater than delta smelt rearing in the less productive, deep channels of the Delta. Support for this hypothesis emerged in 1994 when Hanson Environmental found delta smelt collected from Suisun Bay were larger than delta smelt collected from the lower Sacramento River, suggesting that Suisun Bay might provide good habitat. Without data on individual age, however, it is unknown if the fish collected in Suisun Bay were larger because of increases in growth rate or because fish from Suisun Bay were older than fish collected from upstream locations.

The primary objective of this study was to investigate the age and growth of juvenile delta smelt using otolith microstructral analysis to determine if growth rates differ among locations in the Sacramento-San Joaquin Estuary. Secondarily, diet composition and zooplankton density were analyzed to investigate factors important to the growth and distribution of delta smelt.

Methods

Field Methods. Delta smelt were collected during Department of Fish and Game (DFG) 20mm Surveys 7 (July 10-13) and 8 (July 24-27) in 1996 (Figure 1). In these surveys, delta smelt were collected with a 1,600 micron plankton stretched mesh net measuring 5.1 meters long and mounted on a townet frame (a frame with skids and a mouth opening of 1.5 m^2). Zooplankton samples were collected by a 197 micron Clarke-Bumpus net mounted on top of the townet frame. All zooplankton and fish were preserved in 45% ethanol and taken to the DFG Bay-Delta office for identification. All fish collected were sorted and osmerids were identified to species.

Laboratory Processing. Delta smelt were placed in petri dishes with 2 ml ethanol and measured to the nearest 0.10mm SL. The saccular otoliths (largest pair) were removed using a scalpel. Otoliths removed from fish <20mm SL were mounted in cytoseal and remained unsectioned. Larger otoliths were mounted then sectioned with a low speed saw with a diamond wafering blade. Frontal sections were cut on a plane containing the core and rostrum. Sectioned

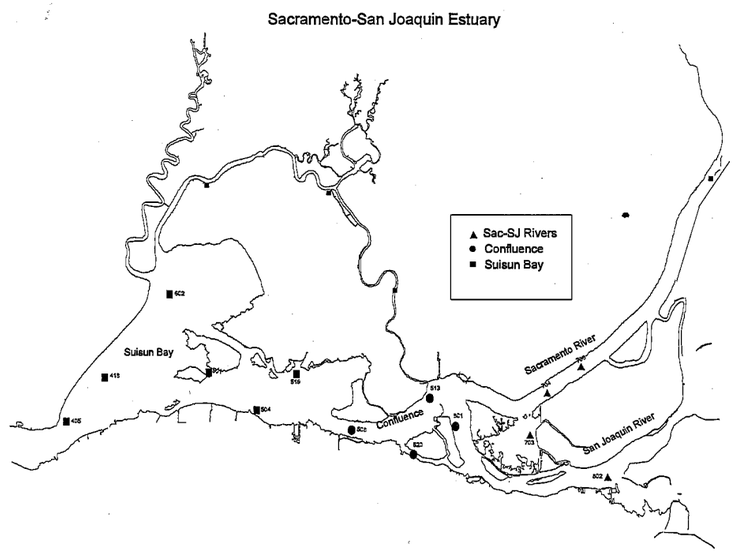

Figure 1
Stations where delta smelt were collected for otolith analysis in July 1996 (DFG 20mm survey).